

Application No.: 10/776,203

IN THE DRAWINGS:

The attached sheets of drawings include changes to Figs. 3A, 4A, 4B, 5A, and 5B. These sheets replace the original sheets including Figs. 3A, 4A, 4B, 5A, and 5B.

Attachment: Replacement Sheets

REMARKS

Introduction

In response to the Office Action dated January 18, 2007, Applicants have amended the specification, drawings, and claims 1, 13, 15-18, and 20-22. Claims 24 and 25 have been added. Care has been taken to avoid the introduction of new matter. The amendment to claim 1 is supported by originally filed claim 10 and paragraphs [0059-0061]. Support for the amendment to claim 13 is found in originally filed claim 19 and paragraphs [0059-0061]. New claims 24 and 25 are supported by paragraphs [0064-0067]. Claims 10, 14, and 19 have been cancelled. In view of the foregoing amendments and the following remarks, Applicants respectfully submit that all pending claims are in condition for allowance.

Claim Rejections Under 35 U.S.C. § 102

Claims 1 and 13 are rejected under 35 U.S.C. § 102(b) as being anticipated by Masahide (JP 06-158311). The Office Action states, “Masahide teaches ...sub-layers with different sputter film thickness profiles such that the first plurality of sub-layers collectively form a uniform thickness layer of selected material.”

As disclosed in the present specification, the spacings or distances between the sputtering surfaces S of the cathode/target assemblies 21_A – 21_B, 22_A – 22_B, and 23_A – 23_B and the precursor substrate/workpiece 2 are **different** between two cathode/target assemblies (*see, e.g.*, Para. [0061] & Fig. 2A). For example, in Fig. 2A, the sputtering surface, S, has a distance d₁ from the cathode/target assembly 21_A. Similarly, the sputtering surface, S, has a distance d₂ from the cathode/target assembly 22_A. As shown in Fig. 2A, the distance d₁ of the sputtering surface

S for the cathode/target assembly 21_A is *smaller* than the distance d₂ from the cathode/target assembly 22_A.

As shown in Fig. 2B, the sputtered film thickness profile is a function of the spacing between the sputtering surface and the substrate during sputter deposition of the sub-layer (*see, e.g.,* Para. [0061]). Although the distances between the sputtering surfaces of the cathode/target assemblies and the substrate vary, the selected material is sequentially deposited on each surface of the substrate to form a substantially uniform thickness layer (*see, e.g.,* Para. [0062] & Fig. 2B).

Masahide teaches forming a uniform thickness profile after sequential deposition (Fig. 5).

However, Masahide fails to teach or suggest, "...the sputtering surface of at least one cathode/target assembly is located at a different spacing from a surface of the at least one substrate/workpiece than another of the cathode/target assemblies" as required by claim 1. In addition, Masahide fails to disclose or suggest, *inter alia*, "...the sputtering surfaces of at least one cathode/target assembly of said first and second groups of cathode/target assemblies are located at a different spacing from the first and second surfaces of said at least one substrate/workpiece than another of the cathode/target assemblies" as required by independent claim 13.

Claims 1 and 13 are rejected under 35 U.S.C. § 102(b) as being anticipated by Nagano (JP 01-287269). The Office Action states, "Nagano teaches ...that the first plurality of sub-layers collectively form a uniform thickness layer of selected material."

However, Nagano fails to disclose or suggest, for example, "...the sputtering surface of at least one cathode/target assembly is located at a different spacing from a surface of the at least

one substrate/workpiece than another of the cathode/target assemblies” as required by claim 1, for example.

Claim Rejections Under 35 U.S.C. § 103

Claims 2-8, 11, 14-17, and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hedgcoth (U.S. Patent No. 4,894,133) in view of Masahide. Claims 2-8 and 11, which depend from claim 1 and claims 14-17 and 20, which depend from claim 13 include all of the features of the base independent claim plus additional features which are not disclosed or suggested by the cited references. Therefore, for at least these reasons, it is respectfully submitted that claims 2-8, 11, 14-17, and 20 also patentably distinguish over the cited references.

Claims 9 and 18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hedgcoth in view of Masahide, and further in view of Nagano.

The Office Action states, “regarding claims 9 and 18, Nagano [teaches a] target assembly 10 having a different length and different width than the other targets 13. Since the targets are of different lengths and widths, it would follow that [the] magnetrons utilized would be of different lengths and widths.”

Nagano, however, states in the abstract:

In this case, the thickness of the film on the substrate passing the upper and lower end parts of the target 10 is diminished, and a film having a thick central part in the cross direction is formed as shown by the curve (a) in the cross section in the cross direction of the substrate 6. The substrate 6 is then passed over the two auxiliary targets 12 and 12 separately provided in the vertical direction of the target 10. **The passing speed is adjusted, or the power to be supplied on the auxiliary targets is controlled** to form a film having the thickness shown by the curve (b) (*emphasis added*).

Nagano describes adjusting the thickness by adjusting the passing speed or the power supplied to the auxiliary targets (abstract). Nagano shows in Fig. 1, the targets 10 and 12 having

different lengths and widths. Nagano fails to disclose or suggest the sputtering surface of at least one cathode/target assembly located at **a different spacing** from a surface of at least one substrate/workpiece than another of the cathode/target assemblies. The Examiner merely alleged that it would have been obvious to combine the teachings of Hedgcoth, Masahide, and Nagano without providing any support for this allegation. The Office Action asserted, "it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Nagano because it allows for forming a film of uniform thickness." The Examiner's unsupported, conclusory statements are not sufficient to create a *prima facie* case of obviousness.

Obviousness can only be established by combining or modifying the teachings of the cited references to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge readily available to one of ordinary skill in the art. *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). There is no suggestion in Nagano to modify the deposition apparatus of Masahide or Hedgcoth to perform sputtering on a sputtering surface of at least one cathode/target assembly located at a different spacing from a surface of at least one substrate/workpiece than another of the cathode/target assemblies, as required by independent claims 1 and 13.

The requisite motivation to support the ultimate legal conclusion of obviousness under 35 U.S.C. § 103 is not an abstract concept, but must stem from the applied prior art as a whole and realistically impel one having ordinary skill in the art to modify a specific reference in a specific manner to arrive at a specifically claimed invention. *In re Deuel*, 51 F.3d 1552, 34 USPQ2d

1210 (Fed. Cir. 1995); *In re Newell*, 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989).

Accordingly, the Examiner is charged with the initial burden of identifying a source in the applied prior art for the requisite realistic motivation. *Smiths Industries Medical System v. Vital Signs, Inc.*, 183 F.3d 1347, 51 USPQ2d 1415 (Fed. Cir. 1999); *In re Mayne*, 104 F.3d 1339, 41 USPQ2d 1449 (Fed. Cir. 1997). There is no motivation in Nagano to modify the deposition apparatus of Masahide or Hedgcoth to make the sputtering surface of at least one cathode/target assembly have a different spacing from a surface of at least one substrate/workpiece than another of the cathode/target assemblies.

In rejecting a claim under 35 U.S.C. § 103, the Examiner is required to discharge the initial burden by, *inter alia*, making "**clear and particular**" factual findings as to a **specific understanding** or **specific technological principle** which would have **realistically** impelled one having ordinary skill in the art to modify an applied reference to arrive at the claimed invention based upon facts, -- not generalizations. *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 57 USPQ2d 1161 (Fed. Cir. 2000); *Ecolchem Inc. v. Southern California Edison, Co.*, 227 F.3d 1361, 56 USPQ2d 1065 (Fed. Cir. 2000); *In re Kotzab, supra*; *In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999). That burden has not been discharged, as the Office Action has provided no factual basis for modifying the deposition apparatus of Masahide to make the sputtering surface of at least one cathode/target assembly have a different spacing from a surface of at least one substrate/workpiece than another of the cathode/target assemblies, as required by claims 1 and 13.

Claims 10 and 19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hedgcoth in view of Masahide, and further in view of Siebert (U.S. Patent 4,858,556). Claims 10 and 19 have been canceled. The present claims are distinguishable over Hedgcoth in view of

Masahide and Siebert because Siebert does not cure the deficiencies of Hedgcoth and Masahide. Siebert does not suggest the sputtering surface of at least one cathode/target assembly have a different spacing from a surface of at least one substrate/workpiece than another of the cathode/target assemblies.

Claims 12 and 21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hedgcoth in view of Masahide, and further in view of U.S. Patent No. 5,441,615 (hereinafter Mukai). Claims 12 and 21, which depend from claims 1 and 13, respectively, include all of the features of the base independent claim plus additional features which are not disclosed or suggested by the cited references. Therefore, for at least these reasons, it is respectfully submitted that claims 12 and 21 also patentably distinguish over the cited references.

Claims 22 and 23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hedgcoth in view of Masahide, and further in view of U.S. Patent No. 5,326,637 (hereinafter Nasu). Claims 22 and 23, which depend from claim 13 include all of the features of the base independent claim plus additional features which are not disclosed or suggested by the cited references. Therefore, for at least these reasons, it is respectfully submitted that claims 22 and 23 also patentably distinguish over the cited references.

Claims 2-9, 11, 14-18, and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hedgcoth in view of Nagano. Claims 2-9 and 11, which depend from claim 1 and claims 14-18 and 20, which depend from claim 13, include all of the features of the base independent claim plus additional features which are not disclosed or suggested by the cited references. Therefore, for at least these reasons, it is respectfully submitted that claims 2-9, 11, 14-18, and 20 also patentably distinguish over the cited references.

Claims 10 and 19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hedgcoth in view of Nagano, and further in view of Siebert. Claims 10 and 19 have been canceled. The present claims are distinguishable over Hedgcoth in view of Nagano and Siebert because Siebert does not cure the deficiencies of Hedgcoth and Nagano. Siebert does not suggest the sputtering surface of at least one cathode/target assembly have a different spacing from a surface of at least one substrate/workpiece than another of the cathode/target assemblies.

Claims 12 and 21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hedgcoth in view of Nagano, and further in view of Mukai. Claims 12 and 21, which depend from claims 1 and 13, respectively, include all of the features of the base independent claim plus additional features which are not disclosed or suggested by the cited references. Therefore, for at least these reasons, it is respectfully submitted that claims 12 and 21 also patentably distinguish over the cited references.

Claims 22 and 23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hedgcoth in view of Nagano, and further in view of Nasu. Claims 22 and 23, which depend from claim 13 include all of the features of the base independent claim plus additional features which are not disclosed or suggested by the cited references. Therefore, for at least these reasons, it is respectfully submitted that claims 22 and 23 also patentably distinguish over the cited references.

In view of the above, it is respectfully submitted that the rejections are overcome.

New Claims

New claim 24 recites, "...a group of spaced-apart deposition stations having a first group of circularly-shaped magnetron magnet assemblies, each circularly-shaped magnetron magnet

assemblies having a diameter corresponding to a thickness profile for depositing the selected material.” New dependent claim 25 recites, “...the second group of circularly-shaped magnetron magnet assemblies provides sub-layers with different sputtered film thickness profiles, such that the sub-layers collectively form the uniform thickness layer of the selected material on the second surface of the at least one substrate/workpiece.” Nothing in the cited references teach or suggest such. It is submitted that these new claims distinguish over the cited references.

Conclusion

In view of the above amendments and remarks, Applicants submit that this application should be allowed and the case passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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